*ELECTRONIC PERMITTING IN U.S. EPA'S DELEGATED PROGRAMS: A REVIEW OF AN EMERGING LANDSCAPE**

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I. INTRODUCTION

Overview

EPA tasked HAZMED to research the feasibility of implementing an electronic permitting system that would enable a facility to apply for and receive a standardized permit for managing hazardous waste stored in tanks, containers, and containment buildings.[1] There were three steps to this research. The first step was to survey existing electronic permitting systems being utilized by state agencies for either environmental media permits or non-environmental permits (e.g., building, zoning, and the like). Second, after determining what existing systems are in place, we developed study evaluation criteria that can be used to compare or rank the various systems on a variety of measures for the EPA WAM's consideration. Third, based on the criteria chosen, in consultation with EPA, we drafted a feasibility report. Of these steps, the current report focuses on discussing the feasibility of existing electronic permitting systems.

Scope and Limits of Research

In embarking upon this research, HAZMED expected to develop criteria that could be systematically evaluated against a number of existing permitting systems. Yet, for several reasons set forth below, we acknowledge that the focus of the research shifted based on the data that was available. First, it took persistence to reach officials willing to candidly share their obstacles and lessons learned with us. When we did make contact, the agency would determine the appropriate person for us to talk with. While some individuals were versed in the technical aspects of the electronic permitting programs and related databases, many agency staffers we spoke with were program specialists that had merely general knowledge concerning the design and implementation of such systems. Consequently, while we attempted to ask the same questions to all participants, the type of information we received differed substantively and in the level of detail; therefore, a systematic comparison of the case study information is difficult to make. Second, as we delved into the details of the various systems, it became obvious to us that to truly evaluate them, this would entail actually testing systems against each other from a performance standpoint. Such rigorous testing, however, would require more time and resources that was allocated to the present study. Specifically, it would require more specialists with expertise in software and database matters than we had budgeted for. Third, we began to realize--based on a small sample size of systems analyzed-- that while we could not conduct a truly technical evaluation, that the

[1] EPA's Office of Solid Waste plans to issue a proposed rule in the *Federal Register* late in the calendar year of 2001. This rule would streamline the permitting process for managing hazardous waste stored in tanks, containers, and containment buildings.

data we collected was based partly on the data the agency was willing to share. Even printed materials available on agency web sites that attempted to evaluate their systems and provide lessons learned arguably were not objective measures that we could base a rigorous study upon. Therefore, we began to view our research as being more of a survey and overview of the electronic permitting landscape, as opposed to a systematic, technical study. Fourth, due to fiscal and timing constraints, this report presents draft recommendations for consideration by EPA to utilize in future studies that evaluate the effectiveness of electronic permits and next steps needed to facilitate implementation of systems at the federal, state, and local level. Moreover, the case studies regarding the programs described, while based on literature and interviews, were not reviewed by the interview participants due to time constraints. Overall, these findings may need refinement based on verification of data collected, as well as further clarification of EPA's long-term goals for this electronic permitting initiative.

Definitions

There are several parties involved in the permitting process. For instance, while there are numerous types of system *users*, including regulators, applicants, system users or interested parties in permitting decisions or appeals, and public parties, there are a smaller universe of parties that apply for and process permits. Consequently, to ensure clarity in this report, we use the following terms to define the various actors:

- applicants (e.g., industry);
- regulators (e.g., federal, state, and local);
- other users (e.g., local health departments); and
- public (e.g., environmental/community groups)

Organization

This report is organized into several sections as follows: case studies from states and municipalities using electronic permitting and associated databases; cross-cutting issues and themes common to all permitting systems; and conclusions and next steps. In addition, at the end of the report HAZMED has compiled three appendices as follows:

- Appendix A- a list of contacts we interviewed, complete with phone numbers, email addresses, and internet addresses, and electronic permitting system/database name for the relevant systems described in each case study;

- Appendix B-[2] additional contacts and sources, including web sites and reports available on-line, that were uncovered through our research, but did not involve interviews; and

- Appendix C- a list of questions posed to interviewees

Research Methods

We researched e-permitting issues using both literature searches of agencies, associations, and private sector organizations to develop a list of currently functioning systems addressing both environmental and non-environmental matters. We found several systems dealing with mining, fisheries, and other environmentally related industries that are not regulated by EPA. And we looked closely at the type of priorities both the public and private sector made in designing and evaluating such systems. Such measures went beyond technical functionality (e.g., software performance and compatibility) to review program goals such as efficiency and increasing coordination and tracking. Based on our literature search, we compiled a list of systems we sought to contact. We attempted to contact these parties by both email and phone. Once an appropriate staff person was designated by the agency and referred to us, we conducted an interview of approximately one hour in duration, attempting to ask a similar set of questions to each party.

II. CROSS-CUTTING ISSUES

In reviewing all the issues raised through the interviews and literature searches, several themes common to many of these systems are apparent. Set forth below is a discussion of these cross-cutting themes. These themes are discussed in conceptual, as opposed to, technical terms with the goal of raising as many issues as possible. The issues discussed below were drawn from the case studies that are further detailed in Section III below.

Systems Containing E-Permitting Functionality and/or Databases

The definition of e-permitting is somewhat elusive. As we began our research, we assumed, e-permitting would be defined as follows:

> *a purely web-based system that covers the entire range of permitting activities from preparing the application to issuing a permit in a fully electronic manner, which enables*

[2]Regarding agencies listed on Appendix B, we attempted to contact states with permitting systems. For states that we were able to reach and schedule interviews for, such parties now appear on Appendix A. While most interviewees were states, we intentionally pursued discussions with a consortium of local government agencies in California that have developed a system for non-environmental issues. See Smart Permit in the case studies below.

> *tracking and sharing of appropriate data between all interested parties, and uses no paper throughout the entire transaction.*

Given this definition, however, we quickly discovered that the systems reviewed in this report vary from using data bases to track information, to completing an electronic application online, to submitting an application via email or the U.S. mail. As a result, true or pure e-permitting systems are, however, difficult to find.

A major issue that drives variation is the close nexus between the concept of e-permitting and the associated databases that support e-permitting systems. In sum, it is difficult to understand and discuss e-permitting without discussing the data component. For example, of all the systems we conducted detailed interviews for, three were merely databases, while approximately four were e-permitting systems supported by databases.[3] Consequently, defining e-permitting raises many challenges. In addition, while many spoke of e-permitting as a major innovation that can expedite the permitting process, others emphasized that it was the databases themselves that allowed the agency to track cases and increase the speed of permit issuance once data was uploaded to the system. In addition, with some web interface, the databases could go beyond being useful internal tracking tools to enable applicants and the public to track the status of such permits.

Some of these systems were works in progress as these systems may take years to design and implement; for example, while they consisted of only databases today that did not allow for web access, they ultimately hope to include web access. A system that allows for a form to be downloaded, completed, printed and sent through the U.S. mail may be described by its administrators as online or "e-permitting". While these may not be deemed pure version of e-permitting, this was viewed by interviewees as a significant innovation with tangible benefits to the regulators, applicants, other users, and the public. We describe these systems– despite their non-"pure" nature-- since they represent the steps that states and others establishing systems will pass through as they craft these evolving systems.

Degree of Sophistication

Another way to measure a system is by reviewing its features and functionality. Collectively, for discussion purposes of this section, we will refer to all the various features and functionality of software and operating systems in terms of their relative *sophistication*. As noted in the paragraph above, the systems described above clearly differ in their level of sophistication as some systems process complex application electronically while others offer only database access. This can be due to several reasons

[3] Of the eight parties interviewed, Region 5 did not explicitly discuss their tracking database's features. Therefore, we do not include them in our tally of eight parties we developed case studies for.

that go beyond the whims of software manufacturers.[4] First, the goals of the system and the universe of data it must address appear to be critical issues. For instance, some programs are focused on e-permit delivery to applicants, while others stress access to databases to check status. A second factor is the complexity of the permitting application process within a particular program. While fishing and building permit applications may be relative simple compared to environmental permits, some environmental permits more readily lend themselves to electronic permitting. As Ohio's SIIMAN staffers indicated, due to the complexity of landfill permits and their many technical attachments (e.g., maps), such permits may not easy candidates for electronic permitting. A third factor, (and related to complexity) is the volume of permits and number of users, which impacts the feasibility of implementation. Again – using SIIMAN as an example-- landfill permits are a small universe and they are applied for and issued relatively infrequently. Therefore, beyond sheer numbers of regulated facilities, the frequency of regulatory deadlines and timing may be important factors that contribute to the volume measure.

Costs and Benefits

There were several measures of costs and benefits; these can be categorized into four categories as follows:

5. financial;
6. regulatory user benefits;
7. applicants; and
8. public/societal.

Financial

Regarding financial benefits, while all systems studied are free to applicants and public users, the development and design costs for these systems were significant and varied considerably. Such costs generally ranged from $1 million to $4 million in contractor/vendor fees for complete systems, but these costs did not include staff hours, many of which were difficult for states to quantify. New Jersey's system development costs were much higher, though the system did seem to be comparatively more sophisticated than many others. Cost savings were, predictably, harder to quantify, though Iowa urged others to consider cost reduction or avoidance from user/public perspective, as opposed to merely claiming that the *agenc*y avoided costs on their balance sheet.

Regulatory Users

[4]We note that no private sector software designers were interviewed for this report. We believe, however, that any subsequent research should involve significant input from such vendors and the system users (e.g., applicants and other interested parties). This additional information is particularly helpful as systems are evaluated in terms of functionality and design and implementation costs. Other parties to be contacted as next steps are detailed at the end of this report.

Agencies all claimed an increase in efficiency in their permit processes due to databases and electronic permitting systems. This efficiency was measured in reduced staff hours in inputting or correcting data, and answering telephone questions from the public and applicants. Moreover, the agencies are clearly benefitting from the ability to track the status of permit applications, as well as coordinate and communicate among offices and other agencies with jurisdiction or to whom they must report. Also, these systems help agencies with compliance and enforcement matters.

Applicants

Applicants were not interviewed at this stage, but anecdotal evidence suggests they are typically major proponents of such systems due to the increased speed at which applications can be processed, and for their ability to obtain on-line status reports. In many cases, applicants were on advisory committees tasked with designing and implementing systems. Such industry input was a major benefit to the value of such systems.

Public/Societal

There are arguably significant public and societal benefits stemming from new system use that go beyond those of individual users claims. Given that greater government agency efficiency and reduced private sector investments can be realized without compromising compliance and enforcement goals, e-permitting is a powerful tool to be harnessed. Based on California's Smart Permit initiative, greater efficiency can likely be realized if uniformity in the various state programs can be achieved. This will enhance the ability of government to share data and, where appropriate, make it more accessible to the public. In addition, other public users, including public agencies with an interest in permitting decisions, now obtain information regarding status of application and hearings; hence public satisfaction has generally grown as the public feels the process is more transparent. Such public expectations for timely information must be met in the future.

Security

Security issues range from attempting to secure applicant's data, including application certification and fees transferred to regulators, to new technologies that are being developed to address such concerns. According to agency officials, secure transfer of electronic data remains a major concern of applicants. At the same time, legislation and technology to protect electronic transfers are evolving simultaneously. Many states, however, have not passed electronic signature legislation. Consequently, many state systems utilize password and identification numbers, as opposed to waiting for legislation to clarify this issue. In addition, certifications and fees still need to be sent through the mail in many states. Systems mainly did not allow for the use of credit card as a means of payment. Iowa is among the several states that noted that applicants preferred sending CD-Roms or floppy discs through the U.S. mail rather than using e-mail transfers of data. Significantly, however, even in Iowa's air program where pure e-permitting does exist, a large percentage of applicants choose not to use it due to security

concerns. In addition, New Jersey asserted that determining the employee has authority to bind the company is a major concern being addressed by their system. Hence security issues can have liability and enforcement ramifications.

Lessons Learned

Several lessons learned emerged through the case studies and literature searches. First, systems that are built through a collaborative planning process with significant input from future users are more likely to be implemented and accepted by applicants. The partnerships crated through such endeavors often have collateral benefits for agencies for future outreach and planning efforts. Second, most states agreed that in building a system, one should not "bite off more than one can chew." For instance, start small and build incrementally based on essential data needs, as opposed to trying to have a system that will pull up the entire universe of information. Third, another lesson expressed is to look at *all* other comparable systems, whether or not they address environmental permit; hence, there are lessons learned from private sector efforts to manage paper-flow issues, regardless of the substantive context. To this end, a review of California's Smart Permit initiative may be instructive.

Data Sharing and Uniformity

A key ingredient voiced by several interviewees is the ability of future permitting systems to communicate with one another. For example, Ohio's various electronic systems cannot communicate with each other within the state. Ideally, however, states should be able to talk to each other and to U.S. EPA about particular permits or applicants. This would enable state regulators to learn how similar situations they are facing were addressed by other states. It can also help leverage agency resources. Given EPA's need for data and unique position to work with all the state and other governmental entities, it is imperative for EPA to take a leadership role in the uniformity effort.

Iowa noted there is a need to make any new systems compatible with EPA's for reporting purposes; they noted that any system has to be *enterprise ready*. States noted that EPA could develop minimal standards, it would help them as they plan for future systems. In addition, Region 5 suggested that crafting a standard regarding the level of detail needed for a specific type of permit would facilitate data sharing among agencies. This would help EPA conduct oversight of state permitting activities and ensure enforcement is conducted with consistency.

Region 5 stated that the public should have access to information about the permitting process from beginning to end. We assume that public interest/environmental groups would support this view. A critical question for system designers is: What is the role of the public and how should systems be designed to accommodate the public's role in meaningful participating in the permitting process.[5]

[5]Consulting with, and obtaining the candid views of community/environmental group representatives is beyond the scope of this report. As detailed at the end of this report, such consultations will be invaluable as EPA's

Clearly, the need to make public information available for use by public needs to be balanced against the need to focus resources on providing and sharing data internally to enhance the efficiency of the permitting process and the potential need to safeguard any information deemed sensitive by applicants. Also, as New Jersey emphasized, local agencies–including health departments– have an interest in permitting decisions and need to be considered in any discussions about which agencies have access to what types of data (e.g., public notices and beyond).

Future Trends

Most system administrators agree that more systems will be put in place in the coming years. In addition, generally, existing systems expect to increase their electronic customer base as paper permits become more obsolete. As these systems move closer towards web-based systems and away from on-line creation (with submittal by CD-Rom), other changes include a greater reliance on GIS tools that can link into databases and be accessible through the web. A last trend is the conversion of e-permitting systems into "e-commerce sites" so that agencies can truly do business using the internet. For example, states such as New Jersey are attempting to create the capability for applicants to apply, certify, and pay for applications using credit cards. This will make such sites true "one-stop" shops, and enable applicants to avoid multiple transactions (e.g., submitting certifications and payment by regular mail). Security issues, however, will have to be addressed to enable these innovations.

III. CASE STUDIES

How Case Studies Were Chosen

Our initial research involved conducting internet literature searches of existing permitting systems with a focus on those being used by state environmental agencies. We selected the case studies based on several factors. We were searching for systems that were as functional as possible-- in sum-- we sought to determine what the state of the art was in this area. Our working hypothesis was that the more sophisticated systems that had been in operation for some time would be in the best position to offer more lessons learned compared to new systems. We were also keenly interested in determining what criteria or factors were considered important in design and implementation.

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own role in electronic permitting, as compared to the regions, states, local governments and public, are defined.

Case Studies

Set forth below are the case study summaries:

Iowa Department of Natural Resources (IDNR), IowAccess

Overview and Features- IowAccess is among the most advanced electronic permitting systems operating nationwide. The system allows for the creation of Title V and construction air permits using email, CD-Rom, or floppy disc. The system is quite flexible and can handle complex attachments, including those in spreadsheets program, such as Lotus, and AutoCAD. It enables the state to track compliance internally through entry into the state air database-- SPARS-- as well as report on air permitting activities to U.S. EPA through its AIRS and NEI systems.

Design and Implementation- The IowAccess had a false start at first, but is now functional. Its design and implementation was aided by an advisory group, that included regulated entities. This group created buy-in and political support to proceed. An essential part of gaining users was offering free, comprehensive training. About 25% of the regulated community is using the system. Currently, the system is supported by two full-time help desk staffers. Staff field about two to three calls a day.

Software and Operating System- The system works on a Power builder frontend and a SQL backend, Windows 95, 98, 2000, and NT, and a variety of spreadsheets, AutoCAD, PDF, TIF and HTML.

Costs and Benefits (includes public and industry feedback)- The IowAccess cost $3-4 million to develop, which includes about $600,000 in IDNR staff costs. The cost to the public is free and is funded from Title V fees. Applicants can check the permit status once it has been imported into the database. The public only sees public information-permit status by company name, yet this cuts down on calls from environmental groups and saves agency resources. Its internal tracking and query capabilities is a major benefit to the state. The system is flexible and can be expanded and adapted to other program areas. The system allows for retrieval of data sets that are needed by permit reviewers. Also, the permitting process has been expedited through this new tool. The state staff has been quite pleased with the system, though some applicants are finding it a challenge getting used to it; enhancing these users skills through training can greatly improve this. IDNR has initiated client-contact meetings with representatives of the regulated community to help evaluate the system, increase communication, and help forge partnerships to address mutual concerns.

Security- Confidentiality is a major issue for applicants – and many prefer using use CD-Rom and submitting it via the U.S. mail, which they believe is a more secure means. Industry has not been comfortable emailing applications to date. Electronic signature legislation has not passed in Iowa yet; therefore, applicants must send signed certifications via the U.S. mail.

Data Sharing With Other Agencies- IowAccess can be shared with U.S. EPA, counties, and IDNR field staff concurrently. A major issue is the need to make any system "enterprise" ready so that it is compatible with any EPA systems, especially since EPA may change the format of their tracking databases in the near future. It is ODBC compliant. It also interfaces with RAPIDS, a database for air emissions in the Great Lakes region.

Vendor Information- No specific information given, but recommends working closely with vendors in development phase.

Future Plans- Within the year IDNR hopes that about 50% of applicants uses this system. IDNR has two other environmental regulatory systems similar to the air system; these include Wastewater regulation and public water supply. Both of these systems could be developed to enable electronic permitting. According to IDNR's Air Quality Bureau Chief, up to 20 states with similar air management approaches could use such a system. According to IDNR, the US EPA regional office supports this belief.

Lessons Learned and Other Comments- Before one embarks on developing an e-permitting system, review other tools in use. Second, you should know what you want and contact vendors that can help. Third, focus on one area at a time. Fourth, start by building a system around your data needs. While government budget decisions are usually driven by a need to reduce or avoid costs in agency budgets, it is important to include cost reduction or avoidance from the client's or citizen's perspective in the decision model.

Michigan Land and Water Management Division, Coastal and Inland Waters Permit Information System (CIWPIS)

Overview and Features- The Land and Water Management Division (LWMD) administers or plays a role in approximately 23 planning and environmental protection programs. To respond to the potentially overlapping state and federal regulations, CIWPIS was developed to enhance the understanding of permit requirements of states and federal laws for construction activities at the land/water interface. CIWPIS allows for applicants to download and print the 15-page application and submit it by regular U.S. mail. Because fees cannot be sent through email in Michigan, the system does not have a true electronic mail interface yet. In addition, an applicant or the public can review the status of the application through this web site.

Design and Implementation- Information not provided.

Software and Operating System- Microsoft Word, Microsoft Access, and Adobe software are used with this system.

Costs and Benefits (includes public and industry feedback)- The agency was unsure about the financial costs to creating this system. The first subset of benefits are those that the agency has gained. CIWPIS allows state headquarters to coordinate with field staff. It coordinates tracking and warns regulators of statutory deadlines. This system speeds up the review process once applications are entered into the system. Second, municipalities and other interveners into the permitting process now have greater access to the public participation process. Notices now go out via the internet, not only to adjacent land owners, but to a wider array of interests.

Security- Because fees cannot be sent through the email in Michigan, this is one reason the system does not have a true electronic mail interface yet. Applicants must send their payment checks through the U.S. mail.

Data Sharing With Other Agencies- CIWPIS allows state headquarters to coordinate with field staff regarding violations, conservation easements and financial assurances. But some state agencies, including Michigan IDNR's Natural Heritage Section, that is responsible for protection of endangered species, has full access to CIWPIS since they have to coordinate with LWMD on permitting decisions. Also, many entities see not the fully operational version of CIWPIS, but CIWPIS "on Line"-- a mirrored version updated in real time, without sensitive internal agency information. Other users include the Army Corps of Engineers, which has concurrent jurisdiction over section 404 permits. In addition, some country health department–many of which are involved in permit reviews (e.g., a seawall application)-- utilize CIWPIS on Line. This is the public version. U.S. EPA only has access to CIWPIS on Line as to most other agencies.

Vendor Information- Information not provided.

Future Plans- Public meeting information will be posted in the future. In addition, while the system has no GIS capabilities yet, that is clearly the direction.

Lessons Learned and Other Comments- Be sure to know who your customers are and what their needs and interest levels are. Our users are small landowners and typically less sophisticated, perhaps, compared to some other universes of permitted facilities.

New Jersey Department of Environmental Protection (NJDEP) - Remote AIMS Data Input User System (RADIUS)

Overview and Features - RADIUS enables applicants to prepare and submit pre-construction and Title V operating air permit applications electronically. Applicants may also submit air emission statements. The system is currently in use for air permits only. RADIUS is provided free of cost to applicants, and can be downloaded from the State's web site, http://www.state.nj.us/dep/aqpp/radius.html.

System features include an application wizard to guide the applicant in the selection of the most appropriate application forms; all the necessary application forms for air permits; a requirements library which facilitates the generation of applicant defined permit conditions and compliance plans; an electronic administrative completeness check; and import and export capabilities which allow the electronic transfer of permit application data.

Design and Implementation - Design and implementation of RADIUS took several years of interfacing with industry and other constituents to determine user requirements. NJDEP conducted a full systems life cycle approach including determining the most practical technology route and system testing.

Software and Operating System - RADIUS is a stand-alone software package that must be loaded onto the applicant's hard drive. RADIUS requires a computer running Windows 95, Windows 98, or Windows NT with at least 64 MB RAM and at least 100 MB free space on the hard drive. Although Internet access is not required, it is preferable to install RADIUS on computers that have Internet access since the program is updated regularly. The system was designed in Power builder by Sybase. The RADIUS database was developed in Oracle, which makes it easy to import and export data to other systems.

Costs and Benefits (includes public and industry feedback) - Data generated using RADIUS is uploaded to New Jersey's Environmental Management System (NJEMS). NJEMS is a multi-media data management and decision support system that stores all permit data and activity performed by the State for all environmental areas. The costs associated with NJEMS and RADIUS is approximately $13M combined. This estimate excludes NJDEP's staff hours.

Use of RADIUS has resulted in better data accuracy since data entry is performed by applicants. Approximately 90% of the State's permit applications are submitted using RADIUS, with the remaining 10% still submitting paper applications through the U.S. mail. There are approximately 50% less returns of applications to applicants due to incomplete or incorrect data. Data created using RADIUS is submitted to the State on disk and is imported to the NJEMS in a matter of seconds, thereby greatly reducing the need to conduct data entry. The review process is expedited because of the ease of data manipulation through NJEMS report generation function, which leads to faster permit approvals. It is also easier for the applicant to submit future changes and for the State to process those changes. Associated electronic documents using Word, Excel may also be included on the disk

The system is in line with EPA's goal of networking/sharing data among States and the Federal government.

Security - Data created using RADIUS are submitted to the State on disk due to data integrity and security concerns. A major issue is not only certifying the user for security purposes, but ensuring they are an authorized corporate representative.

Vendor Information - AMS is the contractor that provided the majority of the programming support work that went into the creation of the NJEMS and RADIUS systems.

Data Sharing With Other Agencies - Ideally, States should be able to share data, but this is not in place in New Jersey. This is the direction in which things should be heading. This is also in line with EPA's future goal of creating some form of centralized data sharing/exchange system. Currently, data can be shared and exported to EPA's PCS data base. Local agencies, including health departments, should be included in discussions regarding data sharing and uniformity since they use public permitting data.

Future Plans - NJDEP is working on developing an online business portal (web-based interface) to NJEMS. The business portal will consist of different modules, the first to address online registration of air equipment (general permits). Registrants will be able to apply, certify, and pay for registration using credit cards. Online certification and authorization will be conducted using PIN codes. This will avoid the need to use an electronic signature or PKI technology.

Lessons Learned and Other Comments - It has taken approximately one year for both the State and industry to realize the benefits/savings associated with RADIUS due to training and proficiency issues. The success of RADIUS is due in part to the State's interface and outreach to industry and other constituents in determining user requirements. The project required sufficient funding, capable staff, and a practical approach to design and development. Some advice from the State is to consider marketing strategies and industry training to improve electronic systems usage. It is also important to disseminate information at the local levels. Moreover, although some system designers are trying to address 100% of the potential issues and users, focusing on 95% instead can reap greater rewards for a more reasonable price.

OHIO EPA- Solid and Infectious Waste Information Management (SIIMAN)

Overview and Features- SIIMAN is a tracking database that addresses RCRA subtitle D data governing non-hazardous solid waste. The permits data is a small component of the overall system. This database provides comprehensive information to support tracking of compliance, monitoring and of permitting activities, among other functions. Based on the sheer volume of information that need to be included in landfill permits, its unique nature on a permit-to-permit basis and number of attachments, there are questions regarding whether portions of these types of applications will ever be processed through electronic means. Parts of these applications, however, are being prepared to be accessible through e-permitting in the near future.

Design and Implementation- The system took about 4 years to create and implement. This was a priority of management..

Software and Operating System- The system runs on an Oracle database.

Costs and Benefits (includes public and industry feedback)- The system cost about $1.5 million to develop. This does not include thousands of hours of agency staff time and merely reflects contractor costs. Agency staff carefully considered the criteria that would govern the system.

The main benefit of SIIMAN is that it facilitates coordination and communication between the field and central offices. It aids staff in project management from both an external communications and compliance standpoint and an internal agency tracking standpoint. For example, it keeps projects flowing and ensures that staff are assigned to tasks. It also contains comprehensive information on exemptions granted and inspections. There are major efficiencies to be gained by having this information readily accessible in a database. Because the database contains historic information, it allows for rapid information collection and dissemination (e.g., information requests) that are made on a regular basis.

Security- Security issues, including electronic signature, will need to be considered as this system evolves from an internal database to one with public access to applications. At the moment, these issues have not been worked through.

Vendor Information- TASC (with offices in Ohio) was the consultant who helped develop the system.

Data Sharing With Other Agencies- A critical criteria in developing future systems or upgrades is the ability of these systems to communicate with one another. For example, Ohio's various electronic systems cannot communicate with each other. Ideally, however, states should be able to talk to each other and to U.S. EPA. This would enable state regulators to learn how similar situations they are facing were addressed by other states. It can also help leverage agency resources. If EPA could develop minimal standards, it would help states as they plan for future systems.

Future Plans- Based on the sheer volume of information that needs to be included in landfill permits, its unique nature on a permit-to- permit basis and number of attachments, there are questions regarding whether these types of applications will ever be conducted through electronic means. Perhaps parts of these applications could be completed and processed electronically since some of the pieces are more simple. But, the breadth of data for landfill permits is much broader compared to air permits, which have a more focused inquiry through the permitting process; hence, this partly explains why the air programs are more advanced in e-permitting. However, there are plans for making this database accessible to the public to allow permit applicants to view the status of their applications and other relevant data. Parts of these applications, however, are being prepared to be accessible through e-permitting in the near future. For instance, basic identifying information about the facility, as opposed to the supporting documentation, could be submitted to the agency electronically through email or other means, which could be uploaded to SIIMAN. It is unclear whether there are plans to allow external stakeholders to access the SIIMAN database to check on permit status. While other programs may have a high volume of permits, this program does not; therefore, such an access program is not

currently a priority. The state is considering the use of Geographic Information Systems (GIS) in future applications as this would help with planning issues, but the costs are considerable.

Lessons Learned and Other Comments- Staff needs to list the major pieces of data that need to be tracked, as opposed to the entire universe of possible information. Too much information or "bells and whistles" can create system and user problems. Use strong databases, such as Oracle to handle all the information.

OHIO EPA, Division of Air Pollution Control (DAPC), State Air Resource System (STARS), STARShip, and PTI.

Overview and Features- Ohio EPA, Division of Air Pollution Control (DAPC) utilizes two different electronic permitting systems. The first system is called the State Air Resource System (STARS) that processes Title V permits, state permits to operate, and annual Title V emissions reports. That software has a companion software called STARShip, which is used by the regulated community to submit Title V permit applications, Title V emissions reports, and sometimes state permit to operate applications. Title V facilities are required to use STARship, while non-Title V facilities are not. The second electronic system is called PTIs 2000, which is a web-based intranet application the agency uses internally to issue permits to install equipment. There is no companion software for the regulated community associated with this software.

Design and Implementation- STARS/STARShip software was designed in 1995. At the time it was very hi-tech. As time goes by it is more antiquated and users have a more difficult time using it.

Software and Operating System- STARS - uses a Windows operating system, Oracle database, Corel 9; STARShip - uses a Windows operating system; and PTIs 2000 - uses a Windows operating system, Microsoft Internet Explorer 5 or above, and Corel 8. STARS and PTIs 2000 have databases where the information is stored. Data can be extracted and viewed by other software in tables. However to export data, the person has to be knowledgeable about the database. In terms of its flexibility, STARS and PTIs 2000 work in conjunction with Word Perfect for creating permits. It is not flexible, in that no other word processing software will work with it. Regarding its adaptability to other software and/or programs, STARS and PTIs 2000 should work well if the other software/programs can process the exported data.

Costs and Benefits (includes public and industry feedback)- STARS/STARShip was approximately $1.1 million for the first product in the mid-90s. Ohio EPA does maintenance on the software; hence there are no estimates on those costs. PTIs2000 cost approximately $46,000 when it was delivered. Ohio EPA staff have upgraded the system many times; however; there is no estimate for that cost. The STARShip software is free and can be downloaded off the web page.

http://www.epa.state.oh.us/dapc/starship/starinfo.html. PTIs 2000 helps the agency with internal use only. STARS houses permit applications and emissions reports and tracks the progress of review and issuance of these permits through the use of task assignments and completion dates. There is no direct connection between this software and other divisions or agencies. STARShip facilitates the creation of the applications and emissions reports housed in STARS. Files are submitted through email. There is no direct connection between this software and other divisions or agencies. About 50% of the users are happy with Starship at this point.

Security- No information was provided.

Data Sharing With Other Agencies- There is no direct connection between STARS/STARShip and other divisions or agencies.

Vendor Information- No information was provided.

Future Plans- DAPC is in the process of rebuilding STARS/STARShip. This new software will include PTIs2000 information as well. At this time it is planned for the new system to be web based.

Lessons Learned and Other Comments- None provided.

SMART PERMIT: Focus on Local Government Permitting Activities, Silicon Valley California

Overview

Local Governments have been innovators in developing electronic permitting to address many routine permits that citizens use, including building permits, which can have an impact on where businesses locate. Consequently, beyond streamlining the permitting process for industry, improvements to the permitting process can lead to economic development in those places that invest in such technologies. In 1993 in California's Silicon Valley cities, counties, and high tech firms met to discuss how to revive the local economy that was stalled. One of the first problems they tackled was streamlining and improving the permit and development review process in the region. In 1995, the 27 cities and 2 counties embarked on an effort to develop electronic permitting systems. Such systems would, according to some businesses, alleviate the $400,000 per day in lost business due to delays and waiting for permitting decisions. In addition, citizens remodeling their homes could also save time gaining permits compared to the past. These issues were addressed by a consortium of corporations and municipalities-- working in concert with private sector web and software experts–on the *Smart Permitting Project*. Smart Permit places development and construction information on the internet, and created an electronic development process that is available all day, every day.

Data Sharing and Uniformity

The Smart Permit Project included several important steps that are relevant to environmental agencies embarking on electronic permitting projects. First, the group sought to consolidate the 400 separate building codes amendments previously found among 27 cities and 2 counties to a uniform set of 11. They also convinced these entities to adopt the same set of building code amendments. The increased uniformity has augmented the effectiveness of a new permitting process because it has simplified the rules that the private sector had to navigate. Such changes in uniformity may be instructive to environmental agencies as they attempt to share information and seek uniform reporting requirements.

Design and Implementation

The second aspect of note was the design and criteria evaluation process employed. After completion of a prototype by the City of Palo Alto, Smart Permitting Steering Committee was formed composed of city managers, corporate facility managers, architect and design engineers, building inspectors, city planners, and technology specialists, which included representatives from 18 cities and 2 counties to address software issues. Through this process, a Systems Requirements for Smart Permitting document was drafted, that them was crafted into an RFP distributed to 10 software vendors. Set forth below are a sample of the criteria that municipalities deemed important in evaluating their e-permitting vendor's programs:

- Current client software
- Server support provided (Microsoft, Unix, etc.)
- Geographical Information System (GIS) Software support (e.g., AutoCAD, ArcInfo, ArcView)
- Internet browser support (e.g., Netscape, Microsoft, other HTML)
- Web page creation tools (e.g., Crystal Reports, Report Smith, others)
- Electronic mail groupware (e.g., Novell, Lotus, Microsoft)
- Mobile computing products
- Company profile (e.g., years in existence, number of staff and technical support personnel, number of total customers and permitting customers, number of customers using latest version)

Lessons Learned

A major lessons learned was that the group of cities were able to develop, test and, implement new systems faster than they could individually. Participation by the high tech and architect community ensured that any product developed would be used upon implementation. A book on the lessons learned will be available later this year. The work on Smart Permit was awarded the 2001 Program Excellence Award for Intergovernmental Cooperation by the International City/County Management Association (ICMA).

U.S. EPA Region 5, Air Program

Note: Since Region 5 spoke mainly about the various states that have e-permitting systems in place, as opposed to their database, this case study is organized differently.

Overview and Features- EPA Region 5 has a database that enables states in the region to share information on federal regulations and permits and allows state permit writers to query other states with permit questions. States in the region have begun providing permits electronically to EPA for placement on their system.

Ideal components of e-permitting system- Ideally, the permit applicant would fill out forms on line that can be tracked by agency and available to the public from the beginning to end of the permitting process. While a few states may have that, many others have forms available on-line that need to be printed out and completed. On the regional database, one can post documents and the public can view these (e.g., draft , proposed, and final permits). But, permit applications, as opposed to permits and associated information on status are voluminous, and are typically available at repositories (e.g., libraries); therefore, moving to a totally electronic model throughout the process would be quite challenging. In terms of implementation challenges, there appear to be many more facilities subject to regulation under the Clean Air Act as compared to RCRA.

Costs and Benefits (includes public and industry feedback)- Reporting and compliance efforts can be enhanced by using these tools.

Data Sharing With Other Agencies- The Regions are concerned with consistency within the permit programs. A major challenge is how to integrate information and reports from all states and send them to US EPA headquarters. Determining a standard regarding the level of detail for permits of a specific type would be beneficial. Also, each state that implements its own program has differing requirements, and it is hard to tell them how to best manage their program. More consistency would allow for systematic comparison, which would help ensure that enforcement is conducted in a even handed manner.

Lessons Learned- There were four lessons that Region 5 sought to share with others. First, do not bite off more than you can chew; start small and build from there. Second, while evaluating existing models, do not review state environmental programs solely– look to the private sector and how they have addressed paperflow issues, fire walls, etc. Third, any system must be cradle to grave and be available to public. Fourth, from an agency perspective, the enforcement and compliance benefits are important to consider.

Wisconsin Department of Natural Resources (WDNR)- System for Wastewater Applications, Monitoring and Permits (SWAMP)

Overview and Features- SWAMP (System for Wastewater Applications, Monitoring and Permits) is a menu-driven, Oracle database designed for generating WPDES permit applications, issuing WPDES permits, and storing monitoring data submitted by applicants. The permit application process is an online application file that the permit applicant must print out and send through the U.S. mail. There is no Internet availability to date. It ensures that applications are properly coordinated and routed to appropriate staff, and that data can be generated through reports.

Design and Implementation- The Permit Applications segment of SWAMP is being completed and is scheduled for implementation in 2001. Other parts of the system are still being developed. SWAMP needed upper level management support for budget and staff to ensure implementation. SWAMP consulted with Michigan and Ohio as we prepared to design this program.

Software and Operating System- The system works off an Oracle database. Permits are generated in Microsoft Word.

Costs and Benefits (includes public and industry feedback)- The system cost about $2 million to design in contractor costs, plus staff time and maintenance. The system is free for users. The system is supported by a help desk staff of three persons, which is needed since users needs lots of support.

SWAMP has reduced the permits backlog, word processing time, and improved consistency of the permits. The hours for the employees answering calls has dropped from 150 to 70. Many of these calls are related to data gathering, which is a major component to making decisions. The SWAMP has also cut down the amount of staff time and help reduce overall time spent with drafting the permits, including what conditions to include.

Security- Currently, the agency envisions use of a secured password and identification number or code. This would be used instead of an electronic signature.

Data Sharing With Other Agencies- This has made interface with EPA's Permit Compliance System (PCS), which is a not particularly user-friendly, much smoother.

Vendor Information- None.

Future Plans- WDNR is working on a new system that will contain multi-media summary information that the public will have access to. Also, SWAMP will eventually have a permit application process that can be completed and submitted on-line over the internet. The projected date of completion is June 2002.

Both agency and outside stakeholders have urged the agency to move forward with this. A pilot program will allow for facility monitoring data to be sent over the internet and limit access to agencies only.

Lessons Learned and Other Comments- Good system documentation and training are important in order to gain acceptance of a system that changes the way people work. Also, any problems and "bugs" that arise must be fixed expeditiously; this requires having resources on hand to do so. Systems like this require lots of testing, which, again, requires resources.

IV. CONCLUSION AND NEXT STEPS

Based on our initial research of existing systems, we conclude that e-permitting systems, broadly defined, are indeed feasible where agency resources are strategically committed to a program that can benefit from its use. Certain permits may lend themselves to e-permitting more readily than others based on their complexity. Given the limited scope of this research, to further clarify the issues raised above, we suggest EPA consider the following next steps:

- Review this report and consider its goals for the electronic permitting initiative.

- Conduct a requirements analysis to determine specific agency needs as well as applicant needs in an e-permitting system. The requirements analysis will identify and analyze the types of information to aid the agency in moving toward implementing an electronic permitting model for standardized permits. This can be accomplished utilizing the following steps:
  - **S** Explore EPA's data needs and its relationship with applicants, other users and the public, including the tracking and sharing of data and addressing uniformity issues; exploring the feasibility of developing minimal data standards; and other means of facilitating development of EPA or state systems that would further the goals of EPA and states.
  - **S** Create and convene *usability groups*, comprised of a representative sample of applicants, regulators, other system users (e.g., health departments), and the public to compare how easily various systems of similar type are to use. This can be done by facility type within the RCRA program, or using other criteria developed by the agency.

- Convene a gathering of key regulators (e.g., federal, state, local) applicants, and environmental group vested in permitting issues to a panel discussion at the 2002 RCRA National Meeting, January 2002.

APPENDIX A

List of Parties Contacted[6]

Federal

Location: **Region 5**
Contact: Genevieve Damico
Email: damico.genevieve@epa.gov
Phone: 312/353-4761
Name of System: NA
URL: NA

State

Location: **Indiana,** IDEM Office of Land Quality
Contact: Michele Oertel
Email: moertel@dem.state.in.us
Phone: 317/234-0235
Name of System: Online Permit Guide
URL: http://www.in.gov/idem/olq/permits/ (Report, Downloadable Application)

Location: **Iowa**, DNR Air Bureau
Contact: Cherity Gabrielle
Email: cherity.gabrielle@dnr.state.ia.us
Phone: 515/281-4873
Name of System: IowAccess
URL: http://www.state.ia.us/main/projects/11.html (Report)

Location: **Michigan,** Department of Environment Quality
The Land and Water Management Division
Contact: William Stone; Lynn Green- agency-wide permitting activities (517-241-7422); or John Clark-software and technical issues (517-335-3169).
Email: stonew@state.mi.us
Phone: 517/373-9244
Name of System: Coastal/Inland Waters Permit Information System (CIWPIS)

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6 While many of these parties became case studies, some, such as Indiana did not. We were able to obtain basic information, such as web site URL, regarding their systems for later use.

URL: http://www.deq.state.mi.us/lwm/Permits/ciwpisqry.asp (Search Application)
Location: **New Jersey**, New Jersey Department of Environmental Protection
Contact: Peter Tenebrusso
Email: NA
Phone: 603-633-2422
Name of System: RADIUS
URL: http://www.state.nj.us/dep/aqpp/ (Report, Online Application)

Location: **Ohio**, Ohio Environmental Protection Agency,
Division of Air Pollution Control
Contact: Erica Engel
Email: erica.engel@epa.state.oh.us
Phone: 614/644-2835
Name of System: STARSHIP
URL: http://www.epa.state.oh.us/dapc/starship/starship.html (Report and Downloadable)

Location: **Ohio**, Ohio EPA - Division of Surface Water
Contact: Paul Novak
Email: paul.novak@epa.state.oh.us
Phone: 614/644-2050
Name of System: SWIMS
URL: http://www.epa.state.oh.us/dsw/swims/ (report, Request Form)

Location: **Ohio**, Ohio EPA - Division of Solid and Infectious Waste Management
Contact: Alison Shackle
Email: alison.shockley@epa.state.oh.us
Phone: 614/728-5335
Name of System: SIIMAN
URL: http://www.epa.state.oh.us/dsiwm/pages/imu.html (Report, Still in Development)

Location: **Wisconsin**, IDNR
Contact: Bob Weber
Email: weberb@dnr.state.wi.us
Phone: 608/266-1387
Name of System: DAR software
URL: http://www.dnr.state.wi.us/org/water/wm/ww/wwpubs/slines3.htm (Report)

APPENDIX B

Other Permitting Applications Reviewed Through Literature Search Only

Location: **Tacoma, Washington**, Public Works Department
Contact: Al Theobald
Email: atebaldi@cityoftacoma.org
Phone: 253/591-5272
Name of System: NA
URL: http://www.co.pierce.wa.us/cfapps/dcis/index.htm (Application)

Location: **Saint Paul, Minnesota**
Contact: Roger Curtis, Robb Golds, Don Cheney
Email: LIEPWeb@ci.stpaul.mn.us
Phone: 651/266-9145
Name of System: Permits Online
URL: http://www.dnr.state.mn.us/license_bureau/licenses.html (Report, Downloadable Form)

Location: **California (Local Governments)**
Contact: NA (webmaster)
Email: calgold@calepa.ca.gov
Phone: 916/322-2947
Name of System: CalGold
URL: http://www.calgold.ca.gov (Search Application, Directory Service of local agencies)
Location: **California**, Cal EPA
Contact: Christine Kinne
Email: Ckinne@CALEPA.ca.gov
Phone: 916/322-2947
Name of System: NA
URL: http://calepa.ca.gov/PACs/ (Report)

Location: **Florida**, Florida Environmental Protection Beaches and Coastal Office
Division of Animal Industry?
Contact: Martin Seeling

Lynda Charles
Email: darm.helpdesk@dep.state.fl.us
Phone: 850/487-4471
Name of System: ARMS Software
URL: http://www8.myflorida.com/licensingpermitting/onlineforms/environment/air/arms/arms.html (Downloadable Software)

Location: **New Mexico**, New Mexico Mining and Mineral Division, Energy Minerals and Natural Resources Department
Contact: Renee Martinez
Email: renee_martinez.its@nmenv.state.nm.us
Phone: 505/827-2855
Name of System: NA
URL: http://www.nmenv.state.nm.us/gwb/mecs2.html#DP (Downloadable Application)

Location: **North Carolina,** North Carolina Of Environmental and Natural Resources
Contact: Patrick Grogan
Email: patrick.grogan@ncmail.net
Phone: 704/799-2987
Name of System: NA
URL: http://www.envhelp.org/html/onestop_permit.html (Report, Tracking Application, Searching Application.)

Location: **Ohio**, Ohio EPA - Division of Drinking and Ground Water
Contact: Brian Tarver
Email: brian.tarver@epa.state.oh.us
Phone: 614/644-2752
Name of System: DRINKware
URL: http://www.epa.state.oh.us/ddagw/drinkware.html (Report, Downloadable, Data Info)

Location: **Texas**, Railroad Commission of Texas
Contact: Susan L. Cisco
Email: susan.cisco@rrc.state.tx.us
Phone: 512/463-5623
Name of System: ECAP
URL: http://www.rrc.state.tx.us/ecap/article.html (Report)

Location: **West Virginia**, West Virginia Division of Environmental Protection
Contact: NA
Email: webadmin@www.dep.state.wv.us
Phone: 304/759-0519

Name of System: EPMS
URL: http://www.dep.state.wv.us/onestop/electronic.html (report)

Location: **U.S. DOI**, Office of Surface Mining
Contact: NA
Email: NA
Phone: NA
Name of System: OSM
URL: http://www.tips.osmre.gov/elec_permit.htm (Report)

Location: **U.S. NOAA**, NMFS, Highly Migratory Species Division
Contact: Mark Murray-Brown
Email: NA
Phone: NA
Name of System: Addresses fishing permits for commercial and recreational purposes.
URL: http://www.nmfspermits.com
http://www.gcn.com/vol119_no24/enterprise/2726-1.html (article)

APPENDIX C

Questions Asked in Interviews

1. What types of permits does the electronic permitting system cover?

2) What are you using the system for--permits applications, internal management tracking, coordinating with other agencies, and/or etc.?

3) Can the software work well with other systems (integrate)?

4) How many ways can the software be used (flexibility). Is the software able to adapt to the users needs?

5) How well does the software adapt to other software and/or programs?

6) How easy is it to implement?

7) What is the cost of the software to the agency to design and implement?

8) What is the cost to the permit applicants?

9) What operating systems is needed (e.g., Unix)?

10) Is the software easy to use and read for the permit applicants?

11) Can we submit and receive permit applications via Internet?

12) Can the permit applicants securely send and receive permitting data to the database from the Internet?

13) What other states or other entities(if any) should we contact?